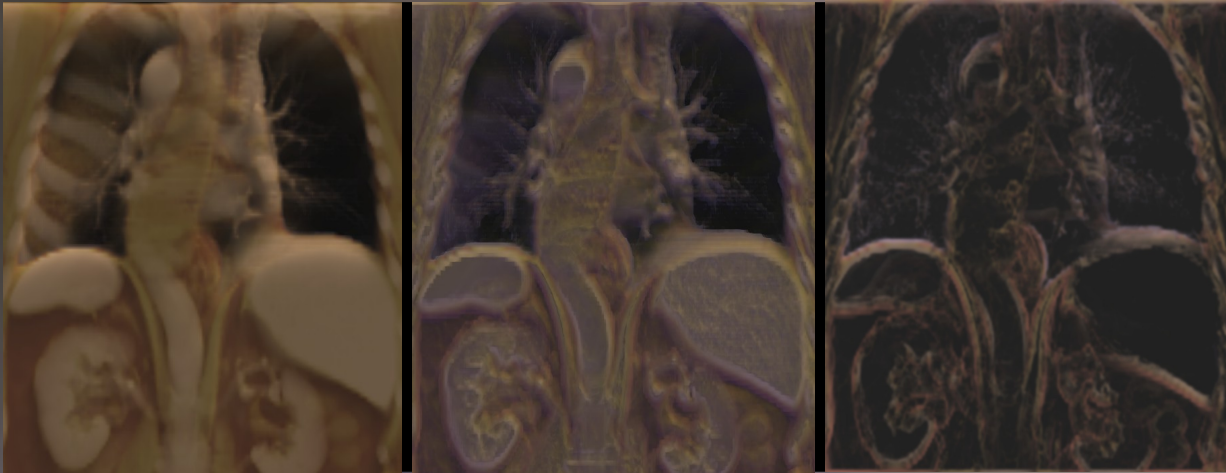


Graphics As an Enabling Technology

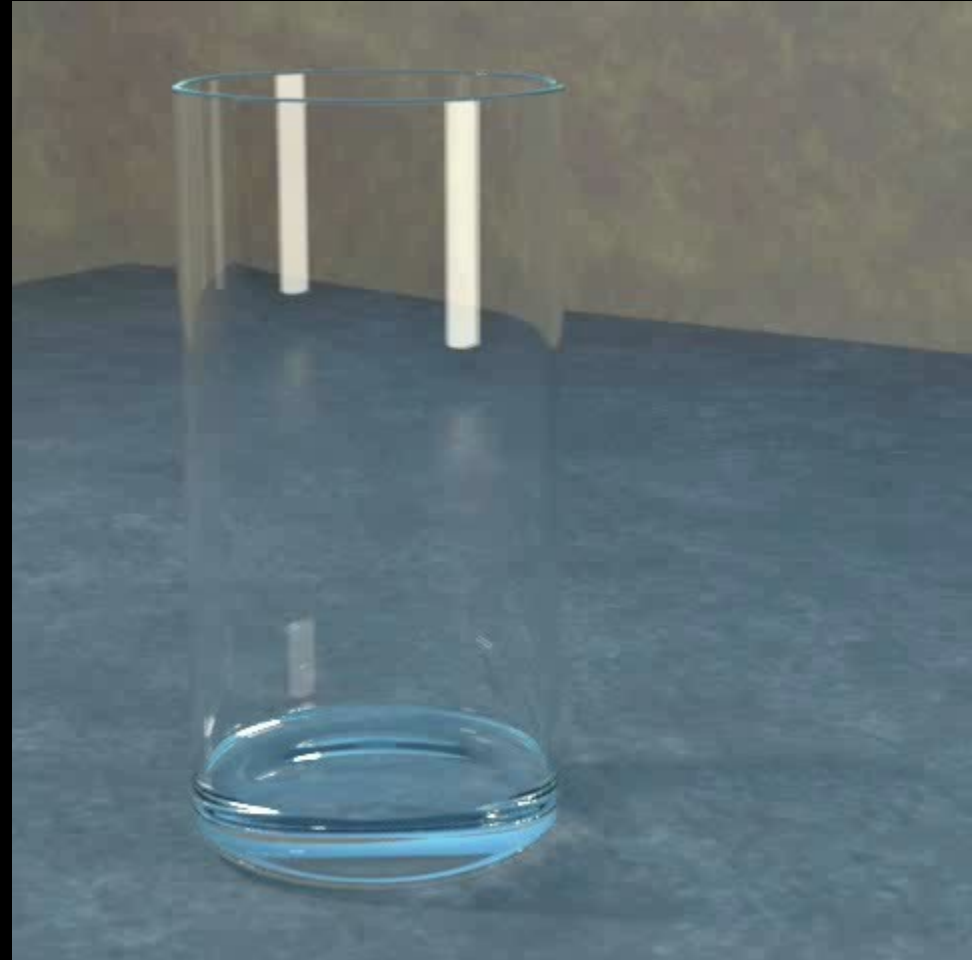


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Where Is Computer Graphics Today?

SAN ANTONIO
SIGGRAPH
2002

*Realistic rendering
and animation is
becoming a solved
problem*

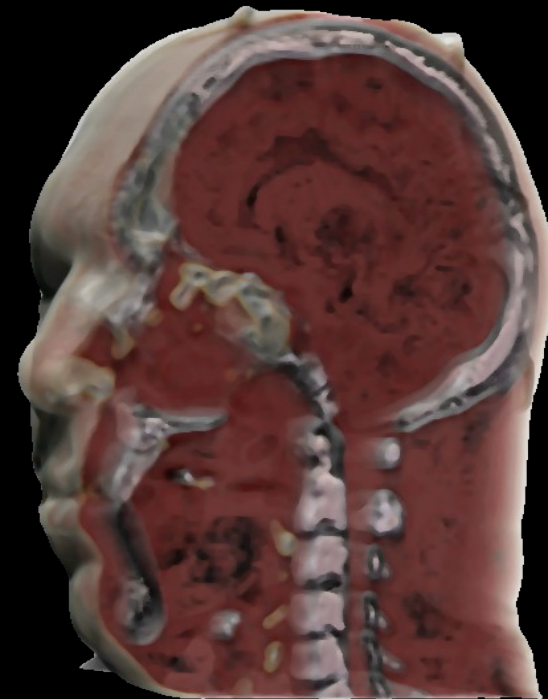
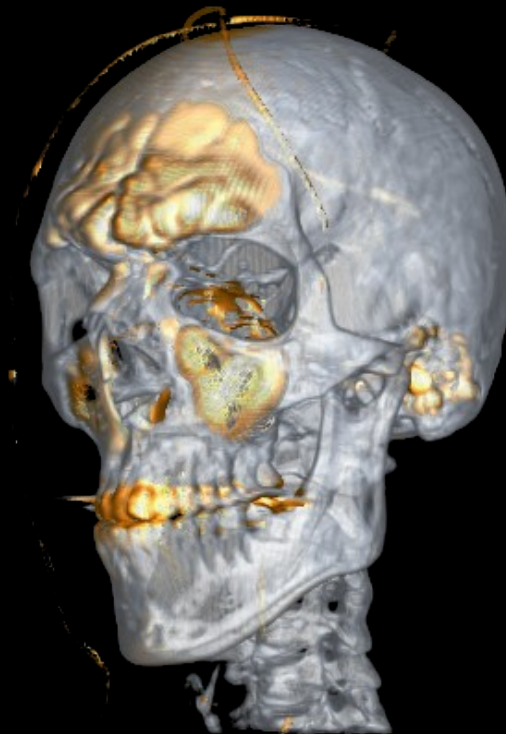


Animation Courtesy of Ron Fedkiw

Where Is Computer Graphics Today?

SAN ANTONIO
SIGGRAPH
2002

*Realistic
rendering and
visualization in
realtime*



What Is Left?

Still improvements to be made in rendering, modeling, and animation

- Change is happening at small increments

Computational / data issues

The Data Deluge

Gigabytes to terabytes of data for most applications

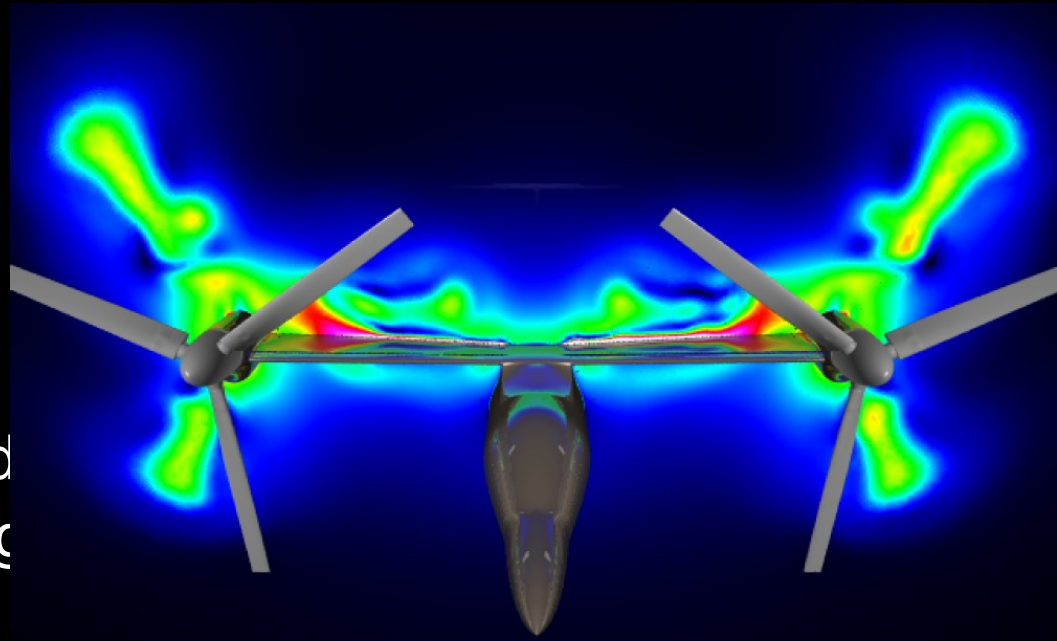
Example 1: movie simulations of natural phenomena

- Water dynamics computed on a large 3D grid
- Millions of tracking particles
- Artists add detail because of simulation expense

The Data Deluge

Example 2: scientific visualization of Osprey-like aircraft

- 7.4 million tetrahedra in simulation
- 1362 timesteps
- Multiple data values per grid point (velocity, vorticity, etc.)
- Very long simulation and visualization time on large machines

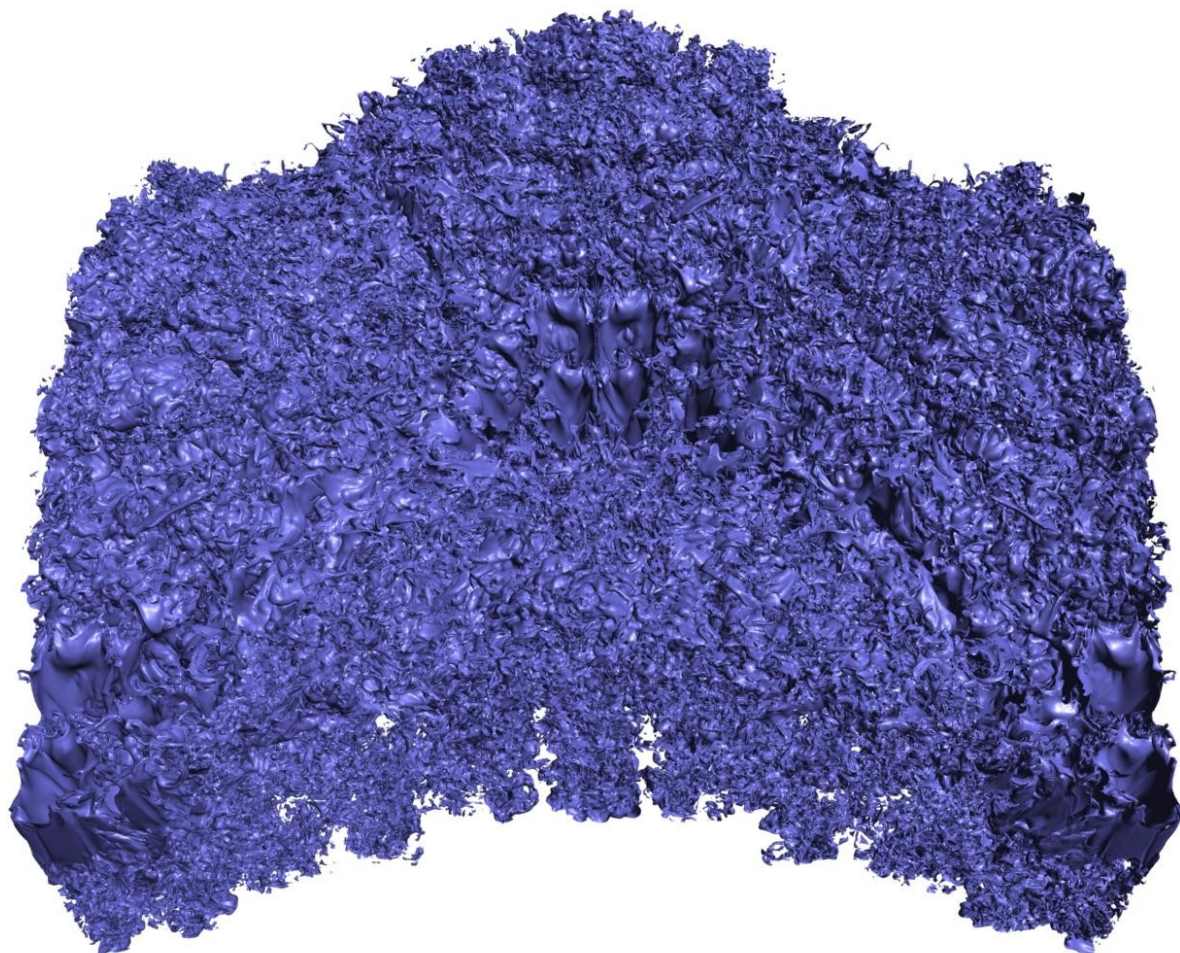


Visualization courtesy of Mississippi State
Engineering Research Center

The Data Deluge

Example 3: scientific visualization of turbulent mixing

- 8 billion voxels per timestep
- 274 timesteps
- Terabytes of data



Data Deluge Result

- *Data size becomes a computational and transfer bottleneck*
- *For many datasets or simulations, you could never look at the entire dataset in detail*
- *Computation time wasted on unimportant details or details that are never seen*
- *A different approach is needed*

The Important Questions Become

- *How to effectively convey information to the user?*
 - *What should be drawn / highlighted?*
 - *How can they gain insight?*
- Creating images to convey information / story to humans
 - Artists and illustrators have known this for centuries!

The Future of Graphics

Graphics is most powerful when combined with

- Effective enhancement / extraction of information
- Perception research
- Art / illustration techniques
- Improved interaction

The Future of Graphics

SAN ANTONIO
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Part of a larger solution

- Biggest pay-off when effectively combined in a solution to a larger problem
- Applications will drive the major advances in CG & HCI
- Rendering and animation will only be one component of the next major advances